SL No of QP :6190

Unique Paper code : **2923060043**

Name of the Paper : **Financial Econometrics**

Name of the Course : BMS

Semester : VI

Duration: **3 Hours** Maximum Marks: **90**

Instructions for Candidates:

(i) Write your Roll No. on the top immediately on receipt of this question paper.

(ii) Attempt any five questions in all.

(iii) All questions carry equal marks.

(iv) Use of Simple calculators are allowed.

Question-1

a) Explain the classical linear regression model.
b) Discuss how OLS estimation can be problematic when applied to financial time series data.

(10 + 8 marks)

Question-2

a) Derive and interpret the ARCH(1) model.
b) Describe the steps involved in estimating an ARCH model and testing for ARCH effects.

(10 + 8 marks)

Question-3

a) Discuss the limitations of applying OLS to financial time series data. (8 marks)
b) The following regression output was obtained from modelling daily returns (in %) of a stock:

$$R_t=0.5+0.8R_{t-1}$$

With standard errors:

- Intercept: 0.2
- Coefficient: 0.1

i) Interpret the model.
ii) Test the significance of the lagged return at the 5% level.
iii) What does this model suggest about market efficiency? (10 marks)

Question-4

a) Discuss the concept and importance of forecasting in financial econometrics.
b) Compare and contrast univariate vs. multivariate time series forecasting methods.

(10 + 8 marks)

Question-5

a) What is a Vector Autoregression (VAR) model? Discuss its application in financial modeling.

b) How would you determine the optimal lag length in a VAR model?

(12 + 8 marks)

Question-6 Attempt any 3

a) Define cointegration. How is it different from correlation?

b) Describe the Engle-Granger two-step method for testing cointegration.

c) Explain the concept of an Error Correction Model (ECM) and its relationship with cointegration.

d) How can cointegration be useful in modeling long-term relationships in finance (e.g., stock indices, interest rates)? (6 x 3 = 18 marks)

Question-7

a) What is a unit root? Explain why testing for unit roots is important in financial econometrics. (6 marks)

b) Given the following ADF regression result for the time series Y_t

$$\Delta Y_t = 0.2 - 0.75 Y_{t-1} + U_t$$

The standard error of the coefficient on Y_{t-1} is 0.25.

i) Conduct a t-test for stationarity at the 5% significance level (use critical value = -2.9).

ii) State the null and alternative hypotheses.

iii) What transformation would you suggest based on the result? (12 marks)